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37S_B_MSc_023

**Heavy Metal Induction for Enhanced Lipid Productivity
in Fresh Water Microalgae**

Project Report Submitted By

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Sponsored by

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and

Karnataka State Council for Science and Technology (KSCST)

Introduction:

Production of greenhouse gas from combusting fossil fuels and their shortage received considerable attention for alternative fuels. One of the promising alternatives is biodiesel and the current major sources of commercial biodiesel are from plants. However, wide-scale development of biodiesel from those resources cannot realistically satisfy the existing demand for transport fuels because it would displace croplands currently used for food crops. In this regard, microalgae have emerged as one of the most promising feedstock owing to their widespread availability and higher oil yields. Oleaginous microalgae have been regarded as potential next-generation feedstocks for biofuels because they exhibit higher photosynthetic efficiency and a greater lipid production rate than terrestrial oil crops (Wijffels and Barbosa, 2010; Stephens et al., 2010).

Heavy metals are chemical elements with a specific gravity that is at least four to five times the specific gravity of water at the same temperature and pressure (Garbarino *et al.*, 1995). Thirty five elements including antimony, arsenic, bismuth, cadmium, cerium, chromium, cobalt, copper, gallium, gold, iron, lead, manganese, mercury, nickel, platinum, silver, tellurium, thallium, tin, uranium, vanadium, and zinc concern us as heavy metals (Glanze, 1996).

In small quantities, certain heavy metals are nutritionally essential for a healthy life. Some of these are referred to as the trace elements (e.g., iron, copper, manganese, and zinc). Heavy metals become toxic when they are not metabolized by the body and accumulate in the soft tissues. Heavy metals may enter the human body through food, water, air, or absorption through the skin when they come in contact with humans in agriculture and in manufacturing, pharmaceutical, industrial, or residential settings. Industrial exposure accounts for a common route of exposure for adults